

## MODEL APPLICATION

Year	Model	Beginning Frame No.
2010	KLE650CAF	JKALEEC1□AA000001 JKALE650CCA000001
2010	KLE650DAF	JKALEED1□AA000001 JKALE650CDA000001
2011	KLE650CBF	JKALEEC1□BDA00001 JKALE650CCDA00001
2011	KLE650DBF	JKALEED1□BDA00001 JKALE650CDDA00001

□:This digit in the frame number changes from one machine to another.



KAWASAKI HEAVY INDUSTRIES, LTD.  
Motorcycle & Engine Company

Part No.99924-1435-02

Printed in Japan



**VERSYS**  
**VERSYS ABS**



# **Motorcycle Service Manual**

# Quick Reference Guide

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## LIST OF ABBREVIATIONS

A	ampere(s)	lb	pound(s)
ABDC	after bottom dead center	m	meter(s)
AC	alternating current	min	minute(s)
ATDC	after top dead center	N	newton(s)
BBDC	before bottom dead center	Pa	pascal(s)
BDC	bottom dead center	PS	horsepower
BTDC	before top dead center	psi	pound(s) per square inch
°C	degree(s) Celsius	r	revolution
DC	direct current	rpm	revolution(s) per minute
F	farad(s)	TDC	top dead center
°F	degree(s) Fahrenheit	TIR	total indicator reading
ft	foot, feet	V	volt(s)
g	gram(s)	W	watt(s)
h	hour(s)	Ω	ohm(s)
L	liter(s)		

## COUNTRY AND AREA CODES

AT	Austria	GB	United Kingdom
AU	Australia	MY	Malaysia
AU LAMS	Australia Leaner Approved Motorcycle Scheme model	SEA	Southeast Asia
BR	Brazil	TH	Thailand
CA	Canada	US	United States
CAL	California	WVTA	Whole Vehicle Type Approval
CH	Switzerland	WVTA (FULL H)	WVTA Model with Honetcomb Catalytic Converter (Full Power)
DE	Germany	GB WVTA (FULL H)	WVTA Model with Honetcomb Catalytic Converter (Left Side Traffic, Full Power)
EUR	Europe		

# Foreword

This manual is designed primarily for use by trained mechanics in a properly equipped shop. However, it contains enough detail and basic information to make it useful to the owner who desires to perform his own basic maintenance and repair work. A basic knowledge of mechanics, the proper use of tools, and workshop procedures must be understood in order to carry out maintenance and repair satisfactorily. Whenever the owner has insufficient experience or doubts his ability to do the work, all adjustments, maintenance, and repair should be carried out only by qualified mechanics.

In order to perform the work efficiently and to avoid costly mistakes, read the text, thoroughly familiarize yourself with the procedures before starting work, and then do the work carefully in a clean area. Whenever special tools or equipment are specified, do not use makeshift tools or equipment. Precision measurements can only be made if the proper instruments are used, and the use of substitute tools may adversely affect safe operation.

**For the duration of the warranty period,** we recommend that all repairs and scheduled maintenance be performed in accordance with this service manual. Any owner maintenance or repair procedure not performed in accordance with this manual may void the warranty.

To get the longest life out of your vehicle.

- Follow the Periodic Maintenance Chart in the Service Manual.
- Be alert for problems and non-scheduled maintenance.
- Use proper tools and genuine Kawasaki Motorcycle parts. Special tools, gauges, and testers that are necessary when servicing Kawasaki motorcycles are introduced by the Service Manual. Genuine parts provided as spare parts are listed in the Parts Catalog.
- Follow the procedures in this manual carefully. Don't take shortcuts.
- Remember to keep complete records of maintenance and repair with dates and any new parts installed.

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## How to Use This Manual

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In this manual, the product is divided into its major systems and these systems make up the manual's chapters. The Quick Reference Guide shows you all of the product's system and assists in locating their chapters. Each chapter in turn has its own comprehensive Table of Contents.

For example, if you want ignition coil information, use the Quick Reference Guide to locate the Electrical System chapter. Then, use the Table of Contents on the first page of the chapter to find the Ignition Coil section.

Whenever you see symbols, heed their instructions! Always follow safe operating and maintenance practices.

### **DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.

### **WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.

### **CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

### **NOTICE**

**NOTICE** is used to address practices not related to personal injury.

This manual contains four more symbols which will help you distinguish different types of information.

## NOTE

○ *This note symbol indicates points of particular interest for more efficient and convenient operation.*

● Indicates a procedural step or work to be done.

○ Indicates a procedural sub-step or how to do the work of the procedural step it follows. It also precedes the text of a NOTE.

★ Indicates a conditional step or what action to take based on the results of the test or inspection in the procedural step or sub-step it follows.

In most chapters an exploded view illustration of the system components follows the Table of Contents. In these illustrations you will find the instructions indicating which parts require specified tightening torque, oil, grease or a locking agent during assembly.

# General Information

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## 1-2 GENERAL INFORMATION

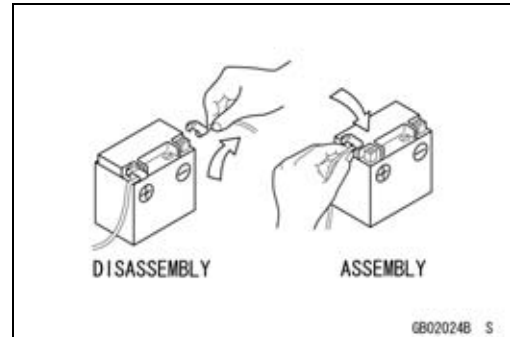
### Before Servicing

Before starting to perform an inspection service or carry out a disassembly and reassembly operation on a motorcycle, read the precautions given below. To facilitate actual operations, notes, illustrations, photographs, cautions, and detailed descriptions have been included in each chapter wherever necessary. This section explains the items that require particular attention during the removal and reinstallation or disassembly and reassembly of general parts.

Especially note the following:

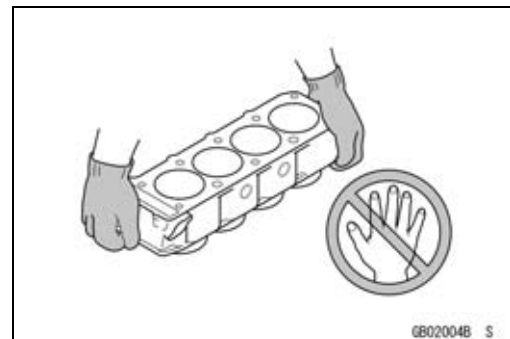
#### **Battery Ground**

Before completing any service on the motorcycle, disconnect the battery cables from the battery to prevent the engine from accidentally turning over. Disconnect the ground cable (-) first and then the positive (+). When completed with the service, first connect the positive (+) cable to the positive (+) terminal of the battery then the negative (-) cable to the negative terminal.



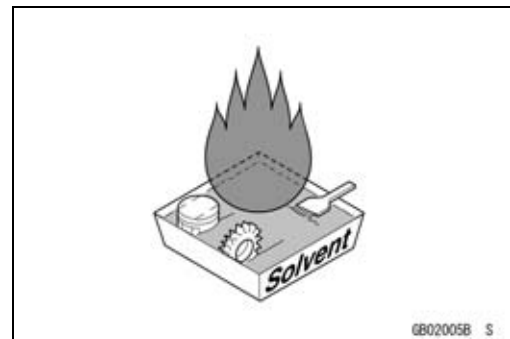
#### **Edges of Parts**

Lift large or heavy parts wearing gloves to prevent injury from possible sharp edges on the parts.



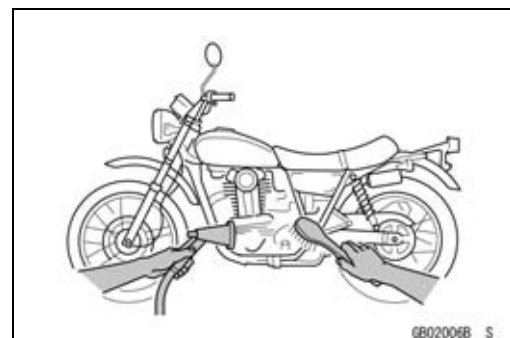
#### **Solvent**

Use a high-flash point solvent when cleaning parts. High-flash point solvent should be used according to directions of the solvent manufacturer.



#### **Cleaning Vehicle before Disassembly**

Clean the vehicle thoroughly before disassembly. Dirt or other foreign materials entering into sealed areas during vehicle disassembly can cause excessive wear and decrease performance of the vehicle.

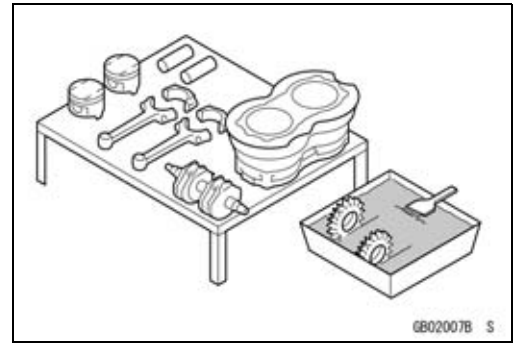




**Before Servicing**

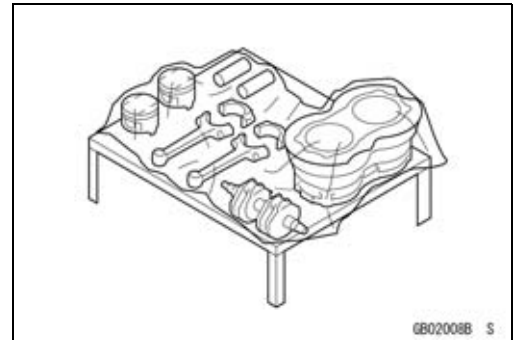
**Arrangement and Cleaning of Removed Parts**

Disassembled parts are easy to confuse. Arrange the parts according to the order the parts were disassembled and clean the parts in order prior to assembly.



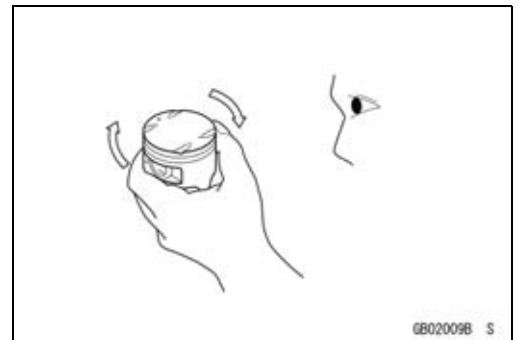
**Storage of Removed Parts**

After all the parts including subassembly parts have been cleaned, store the parts in a clean area. Put a clean cloth or plastic sheet over the parts to protect from any foreign materials that may collect before re-assembly.



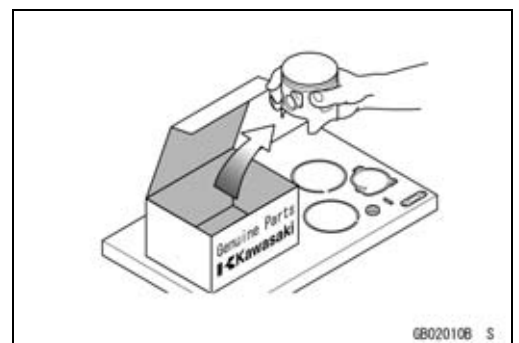
**Inspection**

Reuse of worn or damaged parts may lead to serious accident. Visually inspect removed parts for corrosion, discoloration, or other damage. Refer to the appropriate sections of this manual for service limits on individual parts. Replace the parts if any damage has been found or if the part is beyond its service limit.



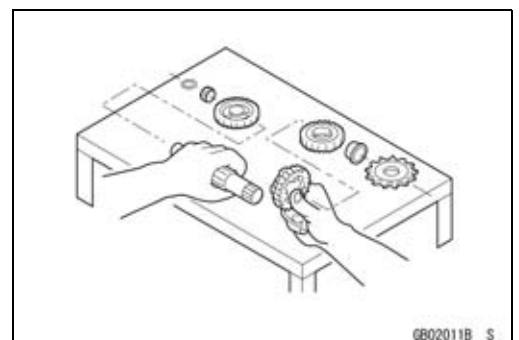
**Replacement Parts**

Replacement parts must be KAWASAKI genuine or recommended by KAWASAKI. Gaskets, O-rings, oil seals, grease seals, circlips, cotter pins or self-locking nuts must be replaced with new ones whenever disassembled.



**Assembly Order**

In most cases assembly order is the reverse of disassembly, however, if assembly order is provided in this Service Manual, follow the procedures given.

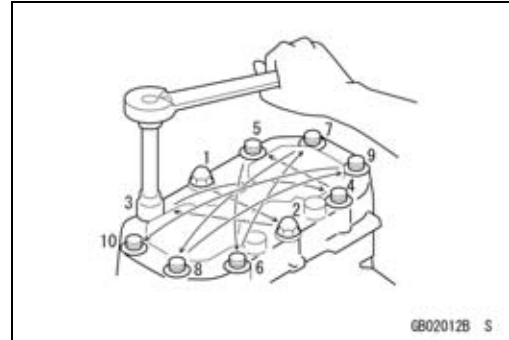


## 1-4 GENERAL INFORMATION

### Before Servicing

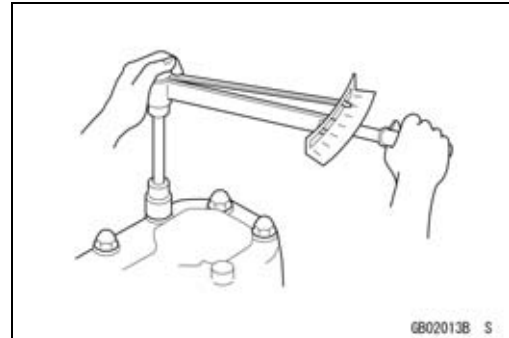
#### **Tightening Sequence**

Generally, when installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit. Then tighten them according to the specified sequence to prevent case warpage or deformation which can lead to malfunction. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter turn and then remove them. If the specified tightening sequence is not indicated, tighten the fasteners alternating diagonally.



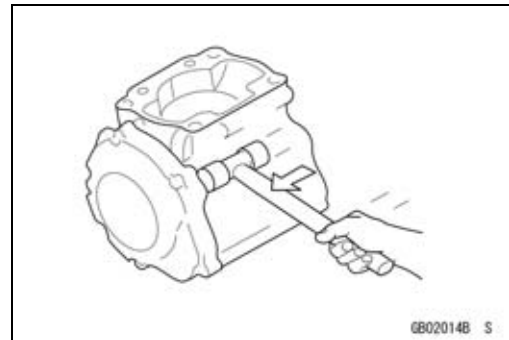
#### **Tightening Torque**

Incorrect torque applied to a bolt, nut, or screw may lead to serious damage. Tighten fasteners to the specified torque using a good quality torque wrench. Often, the tightening sequence is followed twice-initial tightening and final tightening with torque wrench.



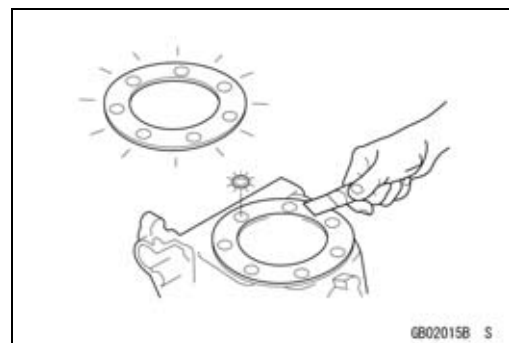
#### **Force**

Use common sense during disassembly and assembly, excessive force can cause expensive or hard to repair damage. When necessary, remove screws that have a non-permanent locking agent applied using an impact driver. Use a plastic-faced mallet whenever tapping is necessary.



#### **Gasket, O-ring**

Hardening, shrinkage, or damage of both gaskets and O-rings after disassembly can reduce sealing performance. Remove old gaskets and clean the sealing surfaces thoroughly so that no gasket material or other material remains. Install new gaskets and replace used O-rings when re-assembling.



#### **Liquid Gasket, Non-permanent Locking Agent**

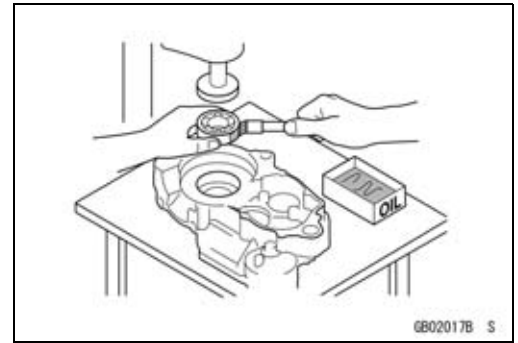
For applications that require Liquid Gasket or a Non-permanent Locking Agent, clean the surfaces so that no oil residue remains before applying liquid gasket or non-permanent locking agent. Do not apply them excessively. Excessive application can clog oil passages and cause serious damage.



**Before Servicing**

**Press**

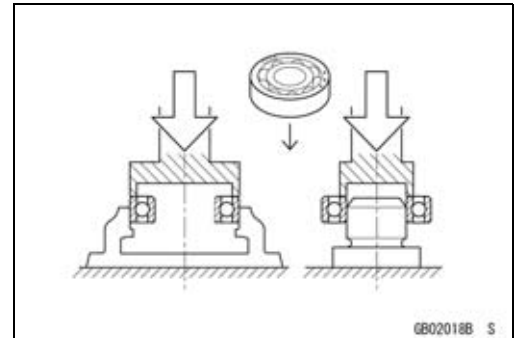
For items such as bearings or oil seals that must be pressed into place, apply small amount of oil to the contact area. Be sure to maintain proper alignment and use smooth movements when installing.



**Ball Bearing and Needle Bearing**

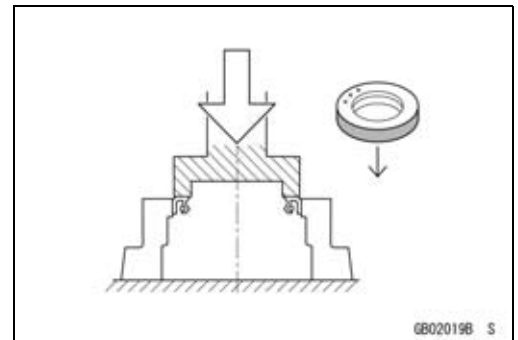
Do not remove pressed ball or needle unless removal is absolutely necessary. Replace with new ones whenever removed. Press bearings with the manufacturer and size marks facing out. Press the bearing into place by putting pressure on the correct bearing race as shown.

Pressing the incorrect race can cause pressure between the inner and outer race and result in bearing damage.

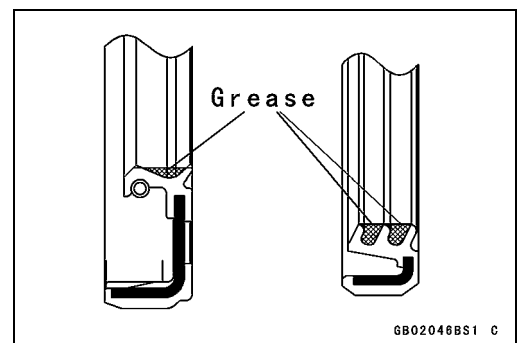


**Oil Seal, Grease Seal**

Do not remove pressed oil or grease seals unless removal is necessary. Replace with new ones whenever removed. Press new oil seals with manufacture and size marks facing out. Make sure the seal is aligned properly when installing.

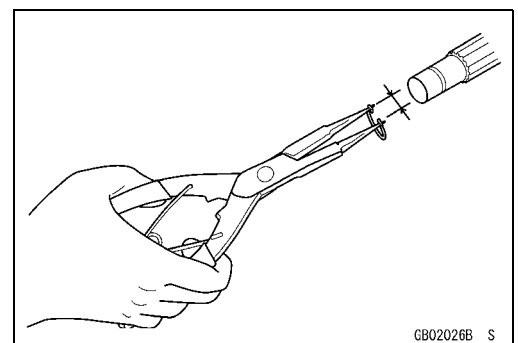


Apply specified grease to the lip of seal before installing the seal.



**Circlips, Cotter Pins**

Replace circlips or cotter pins that were removed with new ones. Take care not to open the clip excessively when installing to prevent deformation.

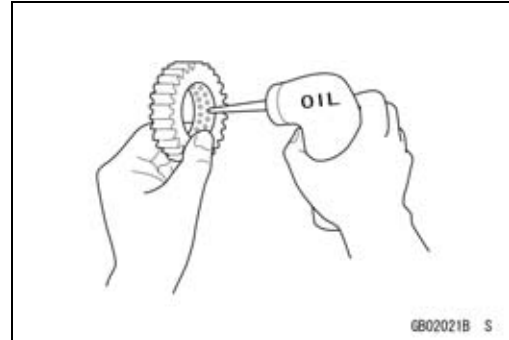


## 1-6 GENERAL INFORMATION

### Before Servicing

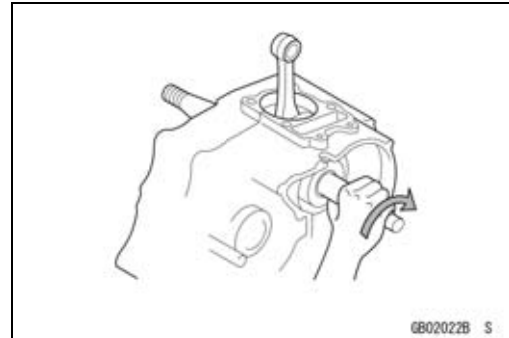
#### **Lubrication**

It is important to lubricate rotating or sliding parts during assembly to minimize wear during initial operation. Lubrication points are called out throughout this manual, apply the specific oil or grease as specified.



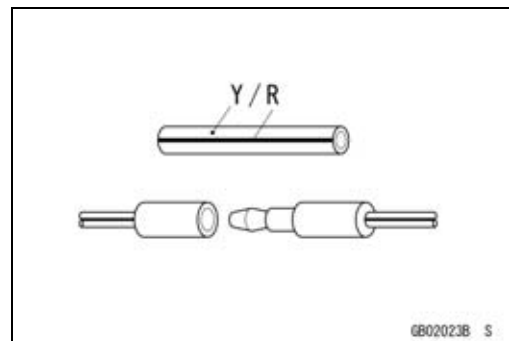
#### **Direction of Engine Rotation**

When rotating the crankshaft by hand, the free play amount of rotating direction will affect the adjustment. Rotate the crankshaft to positive direction (clockwise viewed from output side).



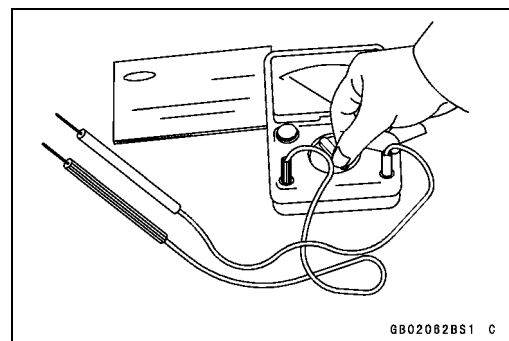
#### **Electrical Wires**

A two-color wire is identified first by the primary color and then the stripe color. Unless instructed otherwise, electrical wires must be connected to those of the same color.



#### **Instrument**

Use a meter that has enough accuracy for an accurate measurement. Read the manufacturer's instructions thoroughly before using the meter. Incorrect values may lead to improper adjustments.



Model Identification

KLE650CAF Left Side View



KLE650CAF Right Side View



# 1-8 GENERAL INFORMATION

## Model Identification

KLE650DAF Left Side View



G8038529 P

KLE650DAF Right Side View



G8038530 P

Frame Number



G8038532

Engine Number



G8038531 P

**General Specifications**

Items	KLE650CAF ~ CBF, KLE650DAF ~ DBF
<p><b>Dimensions</b></p> <p>Overall Length Overall Width Overall Height Wheelbase Road Clearance Seat Height Curb Mass:     KLE650CAF ~ CBF     KLE650DAF ~ DBF Front:     KLE650CAF ~ CBF     KLE650DAF ~ DBF Rear:     KLE650CAF ~ CBF     KLE650DAF ~ DBF Fuel Tank Capacity</p>	<p>2 125 mm (83.7 in.) 840 mm (33.1 in.) 1 330 mm (52.4 in.) 1 415 mm (55.7 in.) 180 mm (7.1 in.) 845 mm (33.3 in.) 206 kg (454 lb) 209 kg (461 lb) 103 kg (227 lb) 105 kg (232 lb) 103 kg (227 lb) 104 kg (229 lb) 19 L (5.0 US gal)</p>
<p><b>Performance</b></p> <p>Minimum Turning Radius</p>	<p>2.7 m (8.8 ft)</p>
<p><b>Engine</b></p> <p>Type Cooling System Bore and Stroke Displacement Compression Ratio Maximum Horsepower  Maximum Torque  Carburetion System Starting System Ignition System Timing Advance Ignition Timing  Spark Plug Cylinder Numbering Method Firing Order</p>	<p>4-stroke, DOHC, 2-cylinder Liquid-cooled 83 x 60 mm (3.3 x 2.4 in.) 649 cm<sup>3</sup> (39.6 cu in.) 10.6 : 1 47 kW (64 PS) @8 000 r/min (rpm) (KLE650DAF, AU LAMS) 25 kW (34 PS) @6 500 r/min (rpm) (KLE650DBF, AU LAMS) 34 kW (46 PS) @7 000 r/min (rpm) (CA, US) – – – 61 N·m (6.2 kgf·m, 45 ft·lb) @6 800 r/min (rpm) (KLE650DAF, AU LAMS) 50 N·m (5.1 kgf·m, 37 ft·lb) @3 000 r/min (rpm) (KLE650DBF, AU LAMS) 54 N·m (5.5 kgf·m, 40 ft·lb) @4 700 r/min (rpm) (CA, US) – – – FI (Fuel injection), KEIHIN TTK38 x 2 Electric starter Battery and coil (transistorized) Electronically advanced (digital igniter in ECU) From 10° BTDC @1 300 r/min (rpm) to 33° BTDC @5 000 r/min (rpm) NGK CR9EIA-9 Left to right, 1-2 1-2</p>

# 1-10 GENERAL INFORMATION

## General Specifications

Items	KLE650CAF ~ CBF, KLE650DAF ~ DBF
Valve Timing: Intake: Open Close Duration Exhaust: Open Close Duration Lubrication System Engine Oil: Type Viscosity Capacity	26° (BTDC) 54° (ABDC) 260° 47° (BBDC) 25° (ATDC) 252° Forced lubrication (semi-dry sump) API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2 SAE 10W-40 2.4 L (2.5 US qt)
<b>Drive Train</b> Primary Reduction System: Type Reduction Ratio Clutch Type Transmission: Type Gear Ratios: 1st 2nd 3rd 4th 5th 6th Final Drive System: Type Reduction Ratio Overall Drive Ratio	Gear 2.095 (88/42) Wet multi disc 6-speed, constant mesh, return shift 2.438 (39/16) 1.714 (36/21) 1.333 (32/24) 1.111 (30/27) 0.966 (28/29) 0.852 (23/27) Chain drive 3.067 (46/15) 5.473 @Top gear
<b>Frame</b> Type Caster (Rake Angle) Trail Front Tire: Type Size Rear Tire: Type Size	Tubular,diamond 25° 108 mm (4.3 in.) Tubeless 120/70 ZR17 MC (58W) Tubeless 160/60 ZR17 MC (69W)



**General Specifications**

Items	KLE650CAF ~ CBF, KLE650DAF ~ DBF
Rim Size: Front Rear Front Suspension: Type Wheel Travel Rear Suspension: Type Wheel Travel Brake Type: Front Rear	 17 x 3.50 17 x 4.50  Telescopic fork (upside-down) 150 mm (5.9 in.)  Swingarm (uni-trak) 145 mm (5.7 in.)  Dual discs Single disc
<b>Electrical Equipment</b> Battery Headlight: Type Bulb Tail/Brake Light Alternator: Type Rated Output	12 V 10 Ah  Semi-sealed beam 12 V 55 W/55W (Hi/Lo) LED  Three-phase AC 24 A/14 V @5 000 r/min (rpm)

Specifications are subject to change without notice, and may not apply to every country.

# 1-12 GENERAL INFORMATION

## Unit Conversion Table

### Prefixes for Units:

Prefix	Symbol	Power
mega	M	× 1 000 000
kilo	k	× 1 000
centi	c	× 0.01
milli	m	× 0.001
micro	μ	× 0.000001

### Units of Mass:

kg	×	2.205	=	lb
g	×	0.03527	=	oz

### Units of Volume:

L	×	0.2642	=	gal (US)
L	×	0.2200	=	gal (IMP)
L	×	1.057	=	qt (US)
L	×	0.8799	=	qt (IMP)
L	×	2.113	=	pint (US)
L	×	1.816	=	pint (IMP)
mL	×	0.03381	=	oz (US)
mL	×	0.02816	=	oz (IMP)
mL	×	0.06102	=	cu in

### Units of Force:

N	×	0.1020	=	kg
N	×	0.2248	=	lb
kg	×	9.807	=	N
kg	×	2.205	=	lb

### Units of Length:

km	×	0.6214	=	mile
m	×	3.281	=	ft
mm	×	0.03937	=	in

### Units of Torque:

N·m	×	0.1020	=	kgf·m
N·m	×	0.7376	=	ft·lb
N·m	×	8.851	=	in·lb
kgf·m	×	9.807	=	N·m
kgf·m	×	7.233	=	ft·lb
kgf·m	×	86.80	=	in·lb

### Units of Pressure:

kPa	×	0.01020	=	kgf/cm <sup>2</sup>
kPa	×	0.1450	=	psi
kPa	×	0.7501	=	cmHg
kgf/cm <sup>2</sup>	×	98.07	=	kPa
kgf/cm <sup>2</sup>	×	14.22	=	psi
cmHg	×	1.333	=	kPa

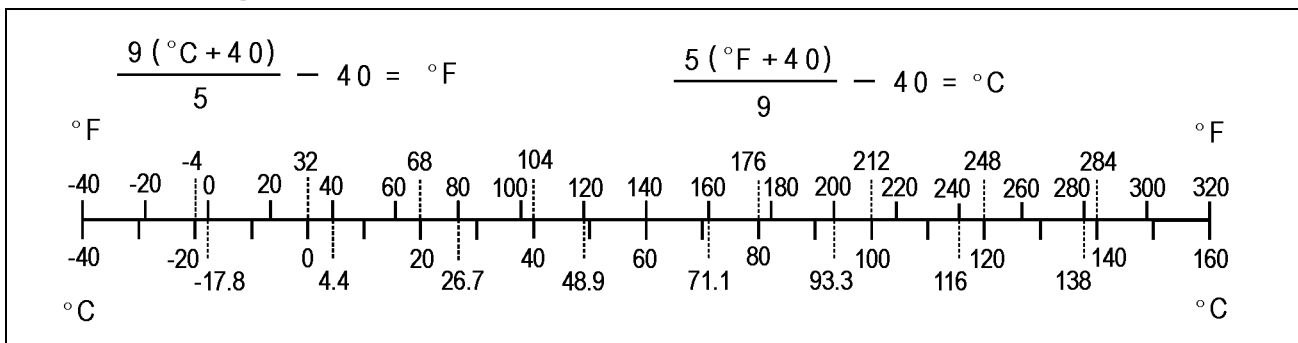
### Units of Speed:

km/h	×	0.6214	=	mph
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### Units of Power:

kW	×	1.360	=	PS
kW	×	1.341	=	HP
PS	×	0.7355	=	kW
PS	×	0.9863	=	HP

### Units of Temperature:



# Periodic Maintenance

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Oil Filter Replacement .....	2-51
Brake Hose Replacement .....	2-52
Brake Fluid Change .....	2-53
Master Cylinder Rubber Parts Replacement .....	2-55
Caliper Rubber Parts Replacement .....	2-56
Spark Plug Replacement .....	2-58

## PERIODIC MAINTENANCE 2-3

### Periodic Maintenance Chart

The scheduled maintenance must be done in accordance with this chart to keep the motorcycle in good running condition. **The initial maintenance is vitally important and must not be neglected.**

#### Periodic Inspection

INSPECTION	FREQUENCY	* ODOMETER READING × 1 000 km (× 1 000 mile)							See Page
	Whichever comes first ↓ Every	1 (0.6)	6 (3.75)	12 (7.5)	18 (11.25)	24 (15)	30 (18.75)	36 (22.5)	
<b>Fuel System</b>									
Air cleaner element - clean				●		●		●	2-14
Throttle control system (play, smooth return, no drag) - inspect	year	●		●		●		●	2-15
Engine vacuum synchronization - inspect				●		●		●	2-16
Idle speed - inspect		●		●		●		●	2-18
Fuel leak (fuel hose and pipe) - inspect	year	●		●		●		●	2-19
Fuel hose and pipe damage - inspect	year	●		●		●		●	2-19
Fuel hose and pipe installation condition - inspect	year	●		●		●		●	2-19
Evaporative emission control system function (CAL, TH and SEA) - inspect		●	●	●	●	●	●	●	2-19
<b>Cooling System</b>									
Coolant level - inspect		●		●		●		●	2-21
Coolant leak (water hose and pipe) - inspect	year	●		●		●		●	2-21
Water hose damage - inspect	year	●		●		●		●	2-21
Water hose installation condition - inspect	year	●		●		●		●	2-21
<b>Engine Top End</b>									
Air suction system damage - inspect				●		●		●	2-22
Valve clearance - inspect	US, CA Model					●			2-22
	Other than US, CA Model	Every 42 000 km (26 250 mile)							
<b>Clutch</b>									
Clutch operation (play, disengagement, engagement) - inspect		●		●		●		●	2-27
<b>Wheels and Tires</b>									
Tire air pressure - inspect	year			●		●		●	2-27
Wheel/tire damage - inspect				●		●		●	2-28
Tire tread wear, abnormal wear - inspect				●		●		●	2-28
Wheel bearing damage - inspect	year			●		●		●	2-29
<b>Final Drive</b>									
Drive chain lubrication condition - inspect #		Every 600 km (375 mile)							2-29

## 2-4 PERIODIC MAINTENANCE

### Periodic Maintenance Chart

INSPECTION	FREQUENCY	* ODOMETER READING							See Page
	Whichever comes first ↓ Every	1 (0.6)	6 (3.75)	12 (7.5)	18 (11.25)	24 (15)	30 (18.75)	36 (22.5)	
Drive chain slack - inspect #	Every 1 000 km (600 mile)							2-30	
Drive chain wear - inspect #			●		●		●	2-32	
Drive chain guide wear - inspect			●		●		●	2-32	
<b>Brakes</b>									
Brake fluid leak (brake hose and pipe) - inspect	year	●	●	●	●	●	●	●	2-33
Brake hose and pipe damage - inspect	year	●	●	●	●	●	●	●	2-33
Brake hose and pipe installation condition - inspect	year	●	●	●	●	●	●	●	2-33
Brake operation (effectiveness, play, no drag) - inspect	year	●	●	●	●	●	●	●	2-34
Brake fluid level - inspect	6 months	●	●	●	●	●	●	●	2-34
Brake pad wear - inspect #			●	●	●	●	●	●	2-35
Brake light switch operation - inspect		●	●	●	●	●	●	●	2-35
<b>Suspension</b>									
Front forks/rear shock absorber operation (damping and smooth stroke) - inspect				●		●		●	2-36
Front forks/rear shock absorber oil leak - inspect	year			●		●		●	2-36
<b>Steering</b>									
Steering play - inspect	year	●		●		●		●	2-37
Steering stem bearings - lubricate	2 years					●			2-38
<b>Electrical System</b>									
Lights and switches operation - inspect	year			●		●		●	2-39
Headlight aiming - inspect	year			●		●		●	2-41
Sidestand switch operation - inspect	year			●		●		●	2-42
Engine stop switch operation - inspect	year			●		●		●	2-43
<b>Others</b>									
Chassis parts - lubricate	year			●		●		●	2-44
Bolts and nuts tightness - inspect		●		●		●		●	2-45

#: Service more frequently when operating in severe conditions; dusty, wet, muddy, high speed or frequent starting/stopping.

\*: For higher odometer readings, repeat at the frequency interval established here.

## PERIODIC MAINTENANCE 2-5

### Periodic Maintenance Chart

#### Periodic Replacement Parts

ITEM	FREQUENCY ↓ Every	* ODOMETER READING × 1 000 km (× 1 000 mile)					See Page
		1 (0.6)	12 (7.5)	24 (15)	36 (22.5)	48 (30)	
Air cleaner element # - replace	2 years						2-46
Fuel hose - replace	4 years					●	2-46
Vehicle-down sensor mounting damper	4 years					●	2-47
Coolant - change	3 years				●		2-47
Radiator hose and O-ring - replace	3 years				●		2-50
Engine oil # - change	year	●	●	●	●	●	2-50
Oil filter - replace	year	●	●	●	●	●	2-51
Brake hose - replace	4 years					●	2-52
Brake fluid - change	2 years			●		●	2-53
Rubber parts of master cylinder and caliper - replace	4 years					●	2-55, 2-56
Spark plug - replace			●	●	●	●	2-58

#: Service more frequently when operating in severe conditions; dusty, wet, muddy, high speed or frequent starting/stopping.

\*: For higher odometer readings, repeat at the frequency interval established here.

## 2-6 PERIODIC MAINTENANCE

### Torque and Locking Agent

The following tables list the tightening torque for the major fasteners requiring use of a non-permanent locking agent or silicone sealant etc.

Letters used in the "Remarks" column mean:

AL: Tighten the two clamp bolts alternately two times to ensure even tightening torque.

EO: Apply engine oil.

L: Apply a non-permanent locking agent to the threads.

Lh: Left-hand Threads

MO: Apply molybdenum disulfide oil solution.

(mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10 : 1)

R: Replacement Parts

S: Follow the specified tightening sequence.

Si: Apply silicone grease (ex. PBC grease).

SS: Apply silicone sealant.

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
<b>Fuel System (DFI)</b>				
Fuel Pump Bolts	9.8	1.0	87 in·lb	L, S
Right Switch Housing Screws	3.5	0.36	31 in·lb	
Sidestand Switch Bolt	8.8	0.90	78 in·lb	L
Crankshaft Sensor Bolts	6.0	0.61	53 in·lb	
Oxygen Sensor (Equipped Models)	44.1	4.5	33	
Spark Plugs	15	1.5	11	
Speed Sensor Bolt	7.8	0.80	69 in·lb	
Timing Rotor Bolt	40	4.1	30	
Water Temperature Sensor	12	1.2	106 in·lb	
<b>Cooling System</b>				
Baffle Plate Bolts	5.9	0.60	52 in·lb	
Radiator Bolt	15	1.5	11	
Radiator Hose Clamp Screws	3.0	0.31	27 in·lb	
Thermostat Housing Bolts	9.8	1.0	87 in·lb	
Water Pump Cover Bolts	9.8	1.0	87 in·lb	
Water Pump Drain Bolt	9.8	1.0	87 in·lb	
Water Pump Impeller Bolt	9.8	1.0	87 in·lb	
Water Temperature Sensor	12	1.2	106 in·lb	
<b>Engine Top End</b>				
Air Suction Valve Cover Bolts	9.8	1.0	87 in·lb	
Baffle Plate Bolts	5.9	0.60	52 in·lb	
Camshaft Cap Bolts	12	1.2	106 in·lb	S
Camshaft Chain Tensioner Cap Bolt	20	2.0	15	
Camshaft Chain Tensioner Mounting Bolts	9.8	1.0	87 in·lb	
Camshaft Sprocket Bolts	15	1.5	11	L
Cylinder Head Bolts (M10)	56	5.7	41	MO, S
Cylinder Head Bolts (M6)	12	1.2	106 in·lb	S
Cylinder Head Cover Bolts	9.8	1.0	87 in·lb	
Rear Camshaft Chain Guide Bolts	20	2.0	15	L
Spark Plugs	15	1.5	11	



## PERIODIC MAINTENANCE 2-7

### Torque and Locking Agent

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Throttle Body Assy Holder Bolts	12	1.2	106 in-lb	
Cylinder Bolt (M8)	27.5	2.8	20	MO,S
Cylinder Nut (M10)	49	5.0	36	MO, S
Cylinder Bolts (M6)	12	1.2	106 in-lb	
Exhaust Pipe Manifold Holder Nuts	17	1.7	12	
Muffler Body Mounting Bolt (Front)	20	2.0	15	
Muffler Body Mounting Bolt (Rear)	20	2.0	15	
<b>Clutch</b>				
Clutch Cable Clamp Bolt	9.8	1.0	87 in-lb	
Clutch Cable Holder Bolts	9.8	1.0	87 in-lb	L
Clutch Cover Mounting Bolts	9.8	1.0	87 in-lb	
Clutch Hub Nut	130	13.3	96	
Clutch Lever Clamp Bolts	7.8	0.80	69 in-lb	S
Clutch Spring Bolts	9.8	1.0	87 in-lb	
Timing Rotor Bolt Cap	4.9	0.50	43 in-lb	
Oil Filler Plug	–	–	–	Hand-tighten
Oil Pump Chain Guide Bolts	12	1.2	106 in-lb	L (1)
Oil Pump Sprocket Bolt	12	1.2	106 in-lb	L, Lh
Timing Inspection Cap	3.9	0.40	35 in-lb	
<b>Engine Lubrication System</b>				
Engine Oil Drain Bolt	30	3.1	22	
Filter Plate Bolts	9.8	1.0	87 in-lb	L
Holder Mounting Bolt	25	2.5	18	L
Lower Fairing Bracket Bolts	12	1.2	106 in-lb	L
Oil Filter	17.5	1.8	13	EO, R
Oil Pan Bolts	12	1.2	106 in-lb	S
Oil Passage Plug	20	2.0	15	L
Oil Passage Plug (M6)	3.9	0.40	35 in-lb	
Oil Pipe Plate Bolt	9.8	1.0	87 in-lb	L
Oil Plate Bolts	9.8	1.0	87 in-lb	L
Oil Pressure Relief Valve	15	1.5	11	L
Oil Pressure Switch	15	1.5	11	SS
Oil Pump Chain Guide Bolts	12	1.2	106 in-lb	L (1)
Oil Pump Cover Bolts	9.8	1.0	87 in-lb	L
Oil Pump Sprocket Bolt	12	1.2	106 in-lb	L, Lh
<b>Engine Removal/Installation</b>				
Engine Mounting Bracket Bolts	25	2.5	18	S
Front Engine Mounting Bolts	44	4.5	32	S
Rear Engine Mounting Nuts	44	4.5	32	R, S
<b>Crankshaft/Transmission</b>				
Breather Plate Bolts	9.8	1.0	87 in-lb	L
Race Holder Screw	4.9	0.50	43 in-lb	L
Connecting Rod Big End Nuts	see Text	←	←	

## 2-8 PERIODIC MAINTENANCE

### Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Crankcase Bolt (M8, L = 110 mm)	27.5	2.8	20	S
Crankcase Bolt (M6, L = 32 mm)	19.6	2.0	14	S
Crankcase Bolts (M6, L = 38 mm)	19.6	2.0	14	S
Crankcase Bolts (M6, L = 45 mm)	19.6	2.0	14	S
Crankcase Bolts (M8, L = 50 mm)	27.5	2.8	20	S
Crankcase Bolts (M8, L = 60 mm)	35	3.6	26	MO, S
Crankcase Bolt (M8, L = 60 mm)	27.5	2.8	20	S
Crankcase Bolts (M8, L = 73 mm)	35	3.6	26	MO, S
Crankcase Bolts (M9, L = 113 mm)	44	4.5	32	MO, S
Crankcase Bolts (M9, L = 83 mm)	44	4.5	32	MO, S
Upper Crankcase Bolt (M8, L = 120 mm)	27.5	2.8	20	S
Upper Crankcase Bolts (M8, L = 110 mm)	27.5	2.8	20	S
Oil Pipe Bolts	9.8	1.0	87 in·lb	L
Oil Plate Bolts	9.8	1.0	87 in·lb	L
Shift Shaft Return Spring Pin	29	3.0	21	L
Timing Rotor Bolt	40	4.1	30	
Drive Shaft Bearing Holder Screw	4.9	0.50	43 in·lb	L
Gear Positioning Lever Bolt	12	1.2	106 in·lb	L
Neutral Switch	15	1.5	11	
Neutral Switch Holder Screw	4.9	0.50	43 in·lb	L
Oil Jet Nozzle	2.9	0.30	26 in·lb	L
Shift Drum Bearing Holder Screws	4.9	0.50	43 in·lb	L
Shift Drum Cam Bolt	12	1.2	106 in·lb	L
Shift Lever Bolt	12	1.2	106 in·lb	L
Shift Rod Plate Bolt	9.8	1.0	87 in·lb	L
Shift Shaft Cover Bolts	9.8	1.0	87 in·lb	L (3)
Shift Shaft Cover Screw	4.9	0.50	43 in·lb	L
Transmission Case Bolts	20	2.0	15	
<b>Wheels/Tires</b>				
Front Axle	108	11.0	80	
Front Axle Clamp Bolt	20	2.0	15	
Rear Axle Nut	108	11.0	80	
<b>Final Drive</b>				
Engine Sprocket Nut	125	12.7	92	MO
Rear Axle Nut	108	11.0	80	
Rear Sprocket Nuts	59	6.0	44	R
Speed Sensor Bolt	7.8	0.80	69 in·lb	L
Speed Sensor Bracket Bolts	9.8	1.0	87 in·lb	
<b>Brakes</b>				
Bleed Valve	7.8	0.80	69 in·lb	
Brake Hose Banjo Bolts	25	2.5	18	
Brake Lever Pivot Bolt	1.0	0.10	9 in·lb	Si
Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	

## PERIODIC MAINTENANCE 2-9

### Torque and Locking Agent

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Front Brake Disc Mounting Bolts	27	2.8	20	L
Front Brake Light Switch Screw	1.2	0.12	11 in-lb	
Front Brake Reservoir Cap Screws	1.5	0.15	13 in-lb	
Front Caliper Mounting Bolts	34	3.5	25	
Front Master Cylinder Clamp Bolts	11	1.1	97 in-lb	S
Bleed Valve	7.8	0.80	69 in-lb	
Brake Hose Banjo Bolts	25	2.5	18	
Brake Pedal Bolt	8.8	0.90	78 in-lb	
Rear Brake Disc Mounting Bolts	27	2.8	20	L
Rear Caliper Mounting Bolts	25	2.5	18	
Rear Master Cylinder Mounting Bolts	25	2.5	18	
Rear Master Cylinder Push Rod Locknut	18	1.8	13	
Brake Pipe Joint Nuts (KLE650D Models)	18	1.8	13	
<b>Suspension</b>				
Front Axle Clamp Bolt	20	2.0	15	
Front Fork Bottom Allen Bolts	20	2.0	15	
Front Fork Clamp Bolts (Lower)	29	3.0	21	AL
Front Fork Clamp Bolts (Upper)	20	2.0	15	
Front Fork Top Plugs	35	3.6	26	
Piston Rod Nuts	20	2.0	15	
Rear Shock Absorber Bolt (Upper)	59	6.0	44	
Rear Shock Absorber Nut (Lower)	59	6.0	44	R
Swingarm Pivot Shaft Nut	108	11.0	80	
<b>Steering</b>				
Front Fork Clamp Bolts (Lower)	29	3.0	21	AL
Front Fork Clamp Bolts (Upper)	20	2.0	15	
Upper Handlebar Holder Bolts	25	2.5	18	S
Lower Handlebar Holder Bolts	25	2.5	18	
Left Switch Housing Screws	3.5	0.36	31 in-lb	
Right Switch Housing Screws	3.5	0.36	31 in-lb	
Steering Stem Head Bolt	108	11.0	80	
Steering Stem Nut	20	2.0	15	
<b>Frame</b>				
Footpeg Holder Bolts	34	3.5	25	L
Front Footpeg Stay Bolts	25	2.5	18	
Rear Footpeg Stay Bolts	25	2.5	18	
Sidestand Bolt	44	4.5	32	
Sidestand Switch Bolt	8.8	0.90	78 in-lb	L
Lower Fairing Mounting Bolts	12	1.2	106 in-lb	
Tandem Grip Mounting Bolts	25	2.5	18	
<b>Electrical System</b>				
License Plate Light Mounting Screws	1.2	0.12	11 in-lb	
Alternator Cover Bolts	9.8	1.0	87 in-lb	

## 2-10 PERIODIC MAINTENANCE

### Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Alternator Lead Holding Plate Bolt	9.8	1.0	87 in·lb	L
Alternator Rotor Bolt	155	15.8	114	MO
Engine Ground Cable Terminal Bolt	9.8	1.0	87 in·lb	
Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
Left Switch Housing Screws	3.5	0.36	31 in·lb	
Right Switch Housing Screws	3.5	0.36	31 in·lb	
Sidestand Switch Bolt	8.8	0.90	78 in·lb	L
Starter Motor Cable Terminal Nut	6.0	0.61	53 in·lb	
Starter Motor Clutch Bolts	34	3.5	25	L
Starter Motor Mounting Bolts	9.8	1.0	87 in·lb	L
Starter Motor Terminal Locknut	11	1.1	97 in·lb	
Starter Motor Through Bolts	5.0	0.51	44 in·lb	
Stator Coil Bolts	12	1.2	106 in·lb	L
Crankshaft Sensor Bolts	6.0	0.61	53 in·lb	
Neutral Switch	15	1.5	11	
Oil Pressure Switch	15	1.5	11	SS
Oxygen Sensor (Equipped Models)	44.1	4.50	32.5	
Spark Plugs	15	1.5	11	
Speed Sensor Bolt	7.8	0.80	69 in·lb	L
Timing Rotor Bolt	40	4.1	30	
Water Temperature Sensor	12	1.2	106 in·lb	
Fuel Level Sensor Bolts	6.9	0.70	61 in·lb	L
Fuel Pump Bolts	9.8	1.0	87 in·lb	L, S
Regulator/Rectifier Bolts	8.8	0.90	78 in·lb	

The table below, relating tightening torque to thread diameter, lists the basic torque for the bolts and nuts. Use this table for only the bolts and nuts which do not require a specific torque value. All of the values are for use with dry solvent-cleaned threads.

#### Basic Torque for General Fasteners

Threads Diameter (mm)	Torque		
	N·m	kgf·m	ft·lb
5	3.4 ~ 4.9	0.35 ~ 0.50	30 ~ 43 in·lb
6	5.9 ~ 7.8	0.60 ~ 0.80	52 ~ 69 in·lb
8	14 ~ 19	1.4 ~ 1.9	10.0 ~ 13.5
10	25 ~ 34	2.6 ~ 3.5	19.0 ~ 25
12	44 ~ 61	4.5 ~ 6.2	33 ~ 45
14	73 ~ 98	7.4 ~ 10.0	54 ~ 72
16	115 ~ 155	11.5 ~ 16.0	83 ~ 115
18	165 ~ 225	17.0 ~ 23.0	125 ~ 165
20	225 ~ 325	23.0 ~ 33.0	165 ~ 240

**Specifications**

Item	Standard	Service Limit
<b>Fuel System (DFI)</b>		
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	---
Idle Speed	1 300 ±50 r/min (rpm)	---
Bypass Screws (Turn Out)	0 ~ 2 1/2 (for reference)	---
Engine Vacuum	37.9 ±1.3 kPa (285 ±10 mmHg)	---
Air Cleaner Element	Polyurethane Foam	---
<b>Cooling System</b>		
Coolant:		
Type (recommended)	Permanent type of antifreeze	---
Color	Green	---
Mixed Ratio	Soft water 50%, Coolant 50%	---
Freezing Point	-35°C (-31°F)	---
Total Amount	1.2 L (1.3 US qt)	---
<b>Engine Top End</b>		
Valve Clearance:		
Exhaust	0.22 ~ 0.31 mm (0.0087 ~ 0.0122 in.)	---
Intake	0.15 ~ 0.21 mm (0.0059 ~ 0.0083 in.)	---
<b>Clutch</b>		
Clutch Lever Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	---
<b>Engine Lubrication System</b>		
Engine Oil:		
Type	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2	---
Viscosity	SAE 10W-40	---
Capacity	1.7 L (1.8 US qt) (when filter is not removed)	---
	1.9 L (2.0 US qt) (when filter is removed)	---
	2.4 L (2.5 US qt) (when engine is completely dry)	---
Level	Between upper and lower level lines (after idling or running)	---
<b>Wheels/Tires</b>		
Tread Depth:		
Front	6.5 mm (0.26 in.)	1 mm (0.04 in.), (AT, CH, DE) 1.6 mm (0.06 in.)
Rear	9.0 mm (0.35 in.)	Up to 130 km/h (80 mph): 2 mm (0.08 in.), Over 130 km/h (80 mph): 3 mm (0.12 in.)
Air Pressure (when Cold):		
Front	Up to 180 kg (397 lb) load: 225 kPa (2.25 kgf/cm <sup>2</sup> , 32 psi)	---
Rear	Up to 180 kg (397 lb) load: 250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	---

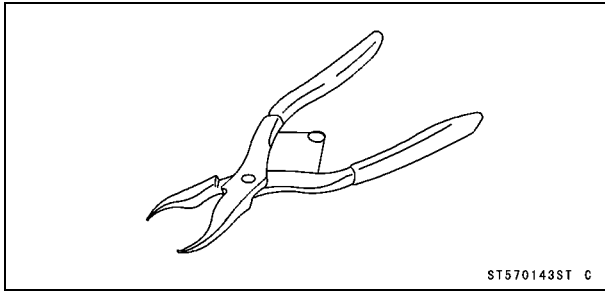
## 2-12 PERIODIC MAINTENANCE

### Specifications

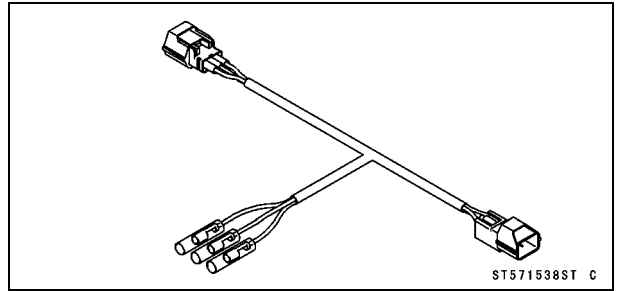
Item	Standard	Service Limit
<b>Final Drive</b>		
Drive Chain Slack	25 ~ 35 mm (1.0 ~ 1.4 in.)	— — —
Drive Chain Wear (20-link Length)	317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)	319 mm (12.6 in.)
Standard Chain:		
KLE650CAF/DAF		
Make	ENUMA	— — —
Type	EK520MVXL	— — —
Link	114 links	— — —
KLE650CBF/DAF		
Make	DAIDO	— — —
Type	DID 520VP2-T	— — —
Link	114 links	— — —
<b>Brakes</b>		
Brake Fluid:		
Grade	DOT4	— — —
Brake Pad Lining Thickness:		
Front	4.5 mm (0.18 in.)	1 mm (0.04 in.)
Rear	5.0 mm (0.20 in.)	1 mm (0.04 in.)
Brake Light Timing:		
Front	Pulled ON	— — —
Rear	ON after about 10 mm (0.39 in.) of pedal travel	— — —
<b>Electrical System</b>		
Spark Plug:		
Type	NGK CR9EIA-9	— — —
Gap	0.8 ~ 0.9 mm (0.031 ~ 0.035 in.)	

Special Tools

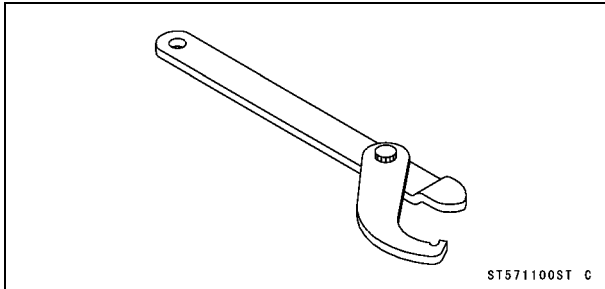
Inside Circlip Pliers:  
57001-143



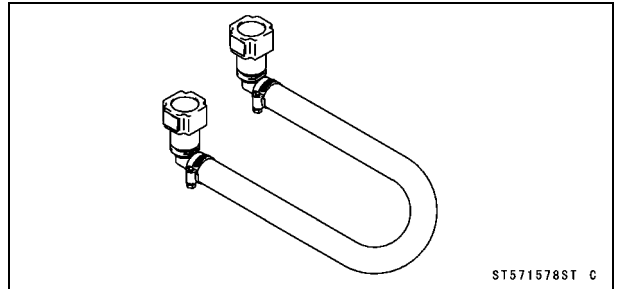
Throttle Sensor Setting Adapter:  
57001-1538



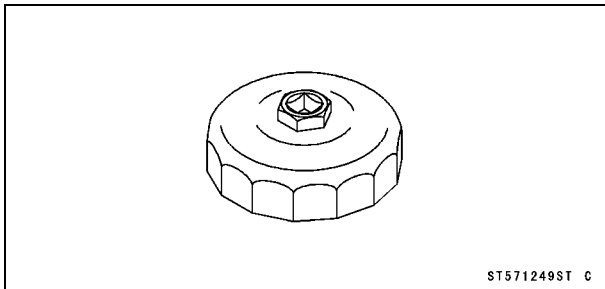
Steering Stem Nut Wrench:  
57001-1100



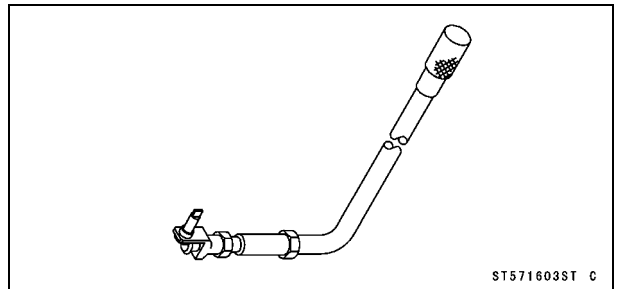
Extension Tube:  
57001-1578



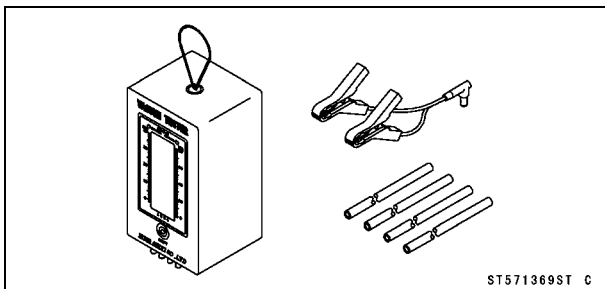
Oil Filter Wrench:  
57001-1249



Pilot Screw Adjuster, E:  
57001-1603



Vacuum Gauge:  
57001-1369



## 2-14 PERIODIC MAINTENANCE

### Periodic Maintenance Procedures

#### Fuel System (DFI)

##### Air Cleaner Element Cleaning

###### NOTE

○ In dusty areas, the element should be cleaned more frequently than the recommended interval.

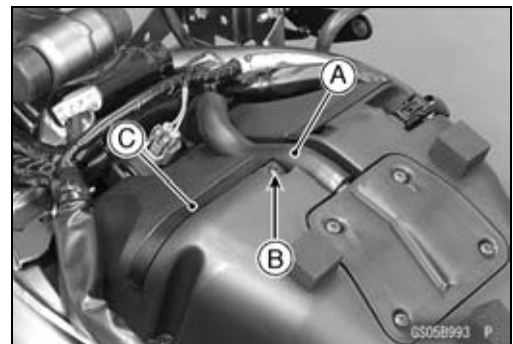
###### ⚠ WARNING

If dirt or dust is allowed to pass through into the throttle assy, the throttle may become stuck, possibly causing accident. Replace the air cleaner element according to the maintenance chart.

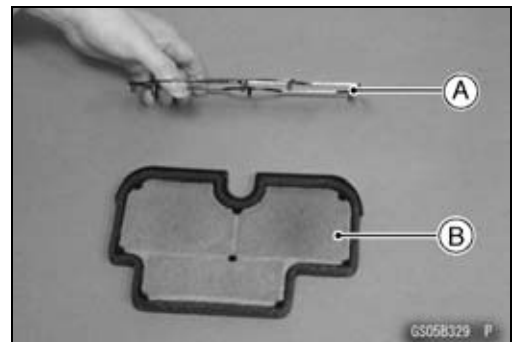
###### NOTICE

If dirt gets through into the engine, excessive engine wear and possibly engine damage will occur.

- Remove:
  - Fuel Tank (see Fuel Tank Removal in the Fuel System (DFI) chapter)
  - Air Switching Valve Hose [A]
  - Air Cleaner Element Screw [B]
  - Air Cleaner Element [C]

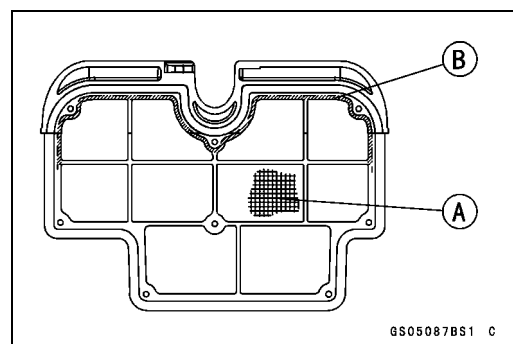


- Remove:
  - Upper Plastic Holder [A]
  - Element [B]



###### NOTE

○ The wire screen [A] is fastened with an adhesive for the shaded portion [B]. Do not remove the wire screen.







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